



SPECIFICATION

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BATTERY POWERED LIGHTER

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TECHNICAL FIELD

The present invention relates to a battery powered lighter that houses a battery therein that electrifies a resistance wire to generate heat, employed for lighting cigarettes and the like.

BACKGROUND ART

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Conventional battery powered lighters mainly utilize double A or triple A batteries. Two of these batteries are housed, connected in series, to electrify a resistance wire heating element such as a nichrome wire with a voltage of 3V. The lighters are utilized by placing the heating element, which serves as an ignition source, in contact with cigarettes and the like.

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There have also been proposed card type battery powered lighters in Japanese Unexamined Utility Model Publication Nos. 63(1988)-142571 and 3(1991)-128251. The card type battery powered lighters employ thin flat batteries or button type batteries, and have Ignition windows which are openable and closable.

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Battery powered lighters are not in widespread use. This is because in comparison with gas lighters, in which fuel gas is ignited to generate a high temperature flame, the amount of energy at the resistance wire heating element is low, resulting in difficult ignition.

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Battery powered lighters which utilize the double A or triple A batteries as described above enable easy battery replacement. However, the thickness of the lighter main body becomes 15mm or greater, to house the batteries therein. Accordingly, there is a drawback in portability, as they become difficult to carry in a breast pocket, for example. In addition, if the voltage is as low as 3V, the amount of generated heat is small, resulting in a drawback that sufficient igniting function is difficult to obtain.

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If a large flat surface is formed on the lighter main body, the entirety of the lighter becomes large. On the other hand, if the lighter is miniaturized, a flat surface thereof becomes small, thereby decreasing the area of a display portion for printing a name, or placing an advertisement. Therefore, miniaturization of the lighter renders the lighter unsuitable as an advertising medium.

Rechargeable batteries such as nickel hydride batteries and lithium ion batteries may be utilized. However, these batteries are expensive, so it would be difficult to apply them to a disposable advertising medium.

On the other hand, the lighters disclosed in the aforementioned Utility Model Publications comprise a slide switch for opening and closing the ignition window, which also serves as a power switch. Thereby, an electrical connection is established in a linked operation with the opening of the ignition window. This structure may lead to inadvertent switching during carriage of the lighter, which exhausts the battery and reduces the number of times that the lighter can be utilized.

DISCLOSURE OF THE INVENTION

The present invention has been developed in view of the points described above. It is the object of the present invention to provide a battery powered lighter that ensures sufficient ignition properties and number of times that the lighter can be utilized, which is thin and superior in portability, and which is employable as an advertising medium.

The battery powered lighter of the present invention comprises:

- a thin flat case;
- a sheet type battery provided within the flat case;
- a resistance wire heating element connected to the sheet type battery; and
- a power switch for opening and closing the connection between the sheet type battery and the resistance wire heating element; wherein

the flat case comprises: an ignition window, open at a position where the heating element faces; a slide member for opening and closing the ignition window; and an operating button for operating the power switch;

5 an operation of the operating button is precluded in the state that the ignition window is closed by the slide member, by a portion of the slide member being interposed between contacts of the power switch; and

10 the power switch is capable of being closed and activated by an operation of the operating button, in the state that the ignition window is open.

It is preferable that a display portion for an advertisement and the like is provided on a flat surface of the flat case. It is also preferable that an operating portion of the slide member and the operating button are positioned adjacent to each other 15 on the flat case. The planar shape of the flat case is capable of being formed to be of the same size as that of a package of cigarettes.

According to the battery powered lighter of the present 20 invention, safety is ensured, due to the configuration wherein the operation button must be manipulated to establish the electrical connection with the heating element, in addition to the operation of the slide member. In addition, inadvertent establishment of the electrical connection during carriage is 25 prevented. Therefore, wasteful consumption of the battery is eliminated, thereby ensuring a sufficient number of times that the lighter can be utilized. Further, by utilizing the sheet type battery, the thickness of the case can be made as thin as 5mm. Therefore, commercialization of the thin battery powered lighter becomes possible, which can be placed unobtrusively in a breast 30 pocket or a bag, that is, which is superior in portability.

Note that by utilizing the sheet type battery, the voltage rating is increased to 6V~6.3V, compared to conventional battery powered lighters, which had employed 3V batteries. Therefore, 35 the ignition properties are markedly improved.

In addition, it is possible to form a display portion having a large area. Therefore, the area in which a name is printed, or an advertisement is placed, is increased, rendering the lighter of the present invention as a suitable low cost advertising medium.

5 By providing the operating portion of the slide member and the operating button adjacent to each other on the flat case, the series of operations required for ignition can be performed favorably.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Figure 1A is a plan view of a battery powered lighter according to a first embodiment of the present invention, in a state of non-use.

Figure 1B is a side view of the battery powered lighter of Figure 1A.

15 Figure 2 is a plan view showing the internal structure of the battery powered lighter of Figure 1A, with a case partially removed.

Figure 3 is a plan view of the battery powered lighter of Figure 1A in a state of use.

20 Figure 4 is a schematic circuit diagram of the battery powered lighter of Figure 1A.

Figure 5 is a perspective view of a battery powered lighter according to a second embodiment of the present invention, during battery replacement.

25 DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, the embodiments of the present invention will be described with reference to the attached drawings. Figure 1A is a plan view of a battery powered lighter 1 according to a first embodiment of the present invention, in a state of non-use.

30 Figure 1B is a side view of the battery powered lighter 1. Figure 2 is a plan view showing the internal structure of the battery powered lighter 1, with a case 2 partially removed. Figure 3 is a plan view of the battery powered lighter 1 in a state of use. Figure 4 is a schematic view showing a circuit structure of the
35 battery powered lighter 1.

The battery powered lighter 1 comprises a thin flat case 2; a sheet type battery 3 provided within the flat case 2; a resistance wire heating element 4 connected to the sheet type battery 3; a power switch 5 for establishing an electrical connection between the sheet type battery 3 and the heating element 4; and a slide member 6.

The flat case 2 comprises a front surface 2a, a back surface 2b, and lateral surfaces 2c. An oval ignition window 21 is provided at the upper central portion of the front surface 2a. A vertically extending slide opening 22 is provided at a central portion of the front surface 2a beneath the ignition window 21. A circular operation button 51 displaceable by pressure is provided adjacent to the slide opening 22. A display portion 23 for printing a name, an advertisement, or the like is provided at the flat surface in the lower half of the front surface 2a. The planar shape of the flat case 2 may be formed to be the same size as that of a package of cigarettes.

Note that the operating button 51 may be formed integrally with the front surface 2a of the flat case 2, to have elasticity by being formed thin. Alternatively, the operating button 51 may be formed as a separate member, and mounted on the flat case 2 to be displaceable in the direction that pressure is applied.

The heating element 4 is provided in the upper portion of the flat case 2. The thickness of the lower portion of the flat case 2 is reduced, opposed to the thickness of the upper portion thereof. The shape of the lateral walls 2c is that of a taper of which the height progressively decreases toward the lower portion.

The sheet type battery 3 is flat and rectangular. The sheet type battery 3 comprises a battery main body as a central layer; metal plates in the form of film, which serve as electrodes, provided on both sides of the battery main body; and insulative sheets provided as the outermost layer on both sides. The insulative sheet on the side of the front surface 2a is provided with an electrode opening. The portion of the metal film exposed

by the electrode opening serves as a first electrode 31 of the sheet type battery. The metal film toward on the side of the back surface 2b is bent to overlap the insulative sheet on the side of the front surface 2a, to serve as a second electrode 32 of the sheet type battery 3. The voltage rating of the sheet type battery 3 is 6V~6.3V, for example.

The sheet type battery 3 described above is mounted and contained in a battery housing portion within the flat case 2. The battery housing portion excludes the upper portion of the flat case 2 at which the heating element 4 is provided. The first electrode 31 is at a position corresponding to the operating button 51 on the front surface 2a. The second electrode 32 is positioned at the upper right corner of the flat case 2.

The heating element 4 is constructed by nichrome wire or the like. The heating element 4 is attached to a fixing portion 24, which is provided at the central upper portion of the flat case 2, at a position that faces the ignition window 21. The fixing portion 24 is constructed by a heat cured resin, and has heat resistant properties. A first terminal 4a of the heating element 4 is connected to the second electrode 32 of the sheet type battery 3. A second terminal 4b of the heating element is connected to a terminal plate 52 of the power switch 5.

The terminal plate 52 is fixed to the back surface of the power switch 5, to face the first electrode 31. When the operating button 51 is depressed, the terminal plate 52 contacts the first electrode 31, to establish an electrical connection between the sheet type battery 3 and the heating element 4. The heating element 4 generates heat and a cigarette or the like is placed in contact therewith to perform ignition. When the operating button 51 is released, the terminal plate 52 is separated from the first electrode 31 due to the elasticity of the operating button 51 in the direction toward which it protrudes. The electrical connection is broken at the power switch 5, and the supply of electricity to the heating element 4 is ceased.

In addition, a lock portion 62, which is integral with the

slide member 6, is interposed between the terminal plate 52 and the first electrode 31 when the slide member 6 is in the position at which it closes the ignition window 21. Therefore, an electrical connection is not established by the power switch 5 even if the operating button is depressed, when the ignition window 21 is closed.

That is, the slide member 6 is provided to be slidable in the vertical direction along the interior surface of the front surface 2a of the flat case 2. The slide member 6 is formed to be long in the vertical direction. A slide operating portion 61 is protrusively provided at the approximate center of the slide member 6. The operating portion 61 is inserted into the slide opening 22 of the front surface 2a, to enable the slide member 6 to be manipulated to move in the vertical direction. In the state shown in Figure 1, wherein the operating portion 61 is moved in the upward direction, the upper end of the slide member 6 closes the ignition window 21. In the state shown in Figure 3, wherein the operating portion 61 is moved in the downward direction, the upper end of the slide member 6 is positioned below the ignition window 21, thereby opening the ignition window 21 to expose the interior heating element 4.

The slide member 6 also comprises the lock portion 62, which extends toward the operating button 51 of the power switch 5, from the side of the slide member 6. As shown in Figure 4, the lock portion 62 is insertable between the terminal plate 52 and the first electrode 31. In the state shown in Figure 1, wherein the slide member 6 is in its upper position, the lock portion is interposed between the contact points of the power switch 5. Therefore, the electrical connection between the sheet type battery 3 and the heating element 4 to be established by the power switch 5 is blocked. On the other hand, in the state shown in Figure 3, wherein the slide member 6 is in its lower position, the lock portion separates from the terminal plate 52 of the power switch 5. In this state, the electrical connection between the sheet type battery 3 and the heating element 4 is capable of being

established.

As described above, in the state that the ignition window 21 is closed by the slide member 6, the lock portion 62 is interposed between the contact points of the power switch, thereby precluding manipulation of the operating button 51. On the other hand, in the state that the ignition window 2 is opened by the slide member 6, ignition is enabled by depressing the operating button 51 to establish the electrical connection at the power switch 5. This structure prevents battery consumption by inadvertent establishment of the electrical connection at the power switch 5.

The operating portion 61 of the slide member 6 and the operating button 51 are positioned adjacent to each other on the flat case 2. The sliding operation of the slide operating portion 61 to open the ignition window 21 and the depressing operation of the operating button 51 are easily performed as a continuous operation. Thereby, the ignition operation is facilitated.

The battery powered lighter 1 described above is disposed without the battery being recharged or replaced, when the sheet type battery 3 runs out and ignition is no longer possible.

A name or an advertisement can be placed in the display portion 23 of the battery powered lighter 1 of the first embodiment. Therefore, in addition to employing an ignition function for lighting cigarettes and the like, the battery powered lighter 1 may be employed as an advertising medium, thereby increasing its utility.

Figure 5 is a perspective view of a battery powered lighter 10 according to a second embodiment of the present invention. The battery powered lighter 10 of the second embodiment replaceably houses a sheet type battery 3, and Figure 5 shows a state of battery replacement. Structural components which are the same as those of the first embodiment are denoted with the same reference numerals, and descriptions thereof will be omitted insofar as they are not necessary.

The battery powered lighter 10 of the second embodiment is

equipped with a flat case 12 for replaceably housing the sheet type battery 3. The flat case 12 comprises: a case main body 12A formed of a rectangular front surface and lateral surfaces around the periphery thereof; and an openable and closable lid 12B as
5 a back surface of the flat case 12.

The lid 12B is rotatably mounted to the case main body 12A by a shaft 13. Undercuts 12d are formed in the interior surfaces of the lateral surfaces of the case main body 12A. When the lid 12B is closed, it engages with the undercuts 12d, to prevent
10 opening of the lid 12B.

Note that although not shown in the figure, an ignition window 21, a slide opening 22, an operating button 51, a display portion 23 and a slide member 6 are provided on the front surface of the case main body 12A, as in the first embodiment.

15 A heating element 4 (not shown) is fixed to a fixing portion 24 provided at the central upper portion of the case main body 12A, in the same manner as in the first embodiment. A first terminal 4a of the heating element 4 is connected to a terminal plate 7. The terminal plate 7 is provided in the case main body
20 12A at a position corresponding to a second electrode 32 of the sheet type battery 3 housed within the case main body 12A. A second terminal 4b is connected to a terminal plate 52 of a power switch, constructed in the same manner as in the first embodiment.

Figure 5 shows the battery powered lighter 10 in a state
25 in which the lid 12B is open. The sheet type battery 3 is mounted in the case main body 12A so that the first electrode 31 and the second electrode 32 face the front surface side, and the lid 12B is closed. At this time, the first electrode 31 faces the terminal plate 52 on the back surface of the operating button 51 with a
30 lock portion 62 of the slide member interposed therebetween. The second electrode 32 contacts the terminal plate 7 and is electrically connected thereto.

Ignition is performed in the same manner as in the first embodiment, by operating the slide member 6 and depressing the
35 operating button 51. In the state that ignition window 21 is

closed by the slide member 6, the lock portion 62 is interposed between the contact points of the power switch 5, precluding depression of the operating button 51. On the other hand, in the state that the ignition window 21 is opened by the slide member 5 6, depression of the operating button 51 establishes an electrical connection between the sheet type battery 3 and the heating element 4, enabling ignition. Long term use of the battery powered lighter of the second embodiment is possible, due to the replaceability of the sheet type battery 3.